Test 1

Total mark

20

1 Choose the correct answer from those given : (12 marks)

1. $\sqrt{-4} \times \sqrt{-9} =$ ....

   (a) 6 (b) -6 (c) $6i$ (d) $-6i$

2. If $x^2 - 2x + 4 = 0$, then $x =$ ....

   (a) $1 \pm 3i$ (b) $1 \pm \sqrt{3}$ (c) $1 \pm \sqrt{3}\, i$ (d) $1 \pm i$

3. If $\Delta ABC \sim \Delta XYZ$ and $AB = 3\, XY$, then $\frac{\text{area } (\Delta XYZ)}{\text{area } (\Delta ABC)} =$ ....

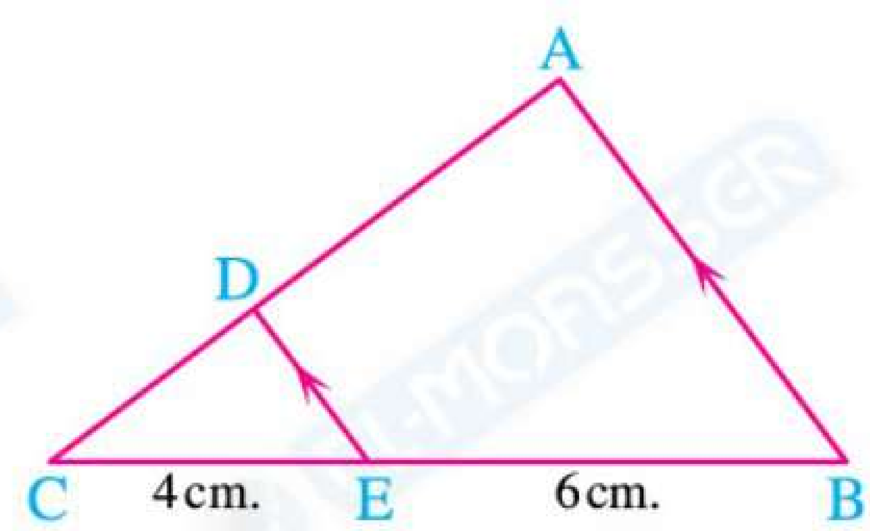
   (a) 3 (b) 9 (c) $\frac{1}{3}$ (d) $\frac{1}{9}$

4. If the terminal side of an angle of measure $(-30°)$ in standard position is rotated anticlockwise one and half revolutions, then the terminal side will be in the .... quadrant.

   (a) first (b) second (c) third (d) fourth

5. **In the opposite figure :**

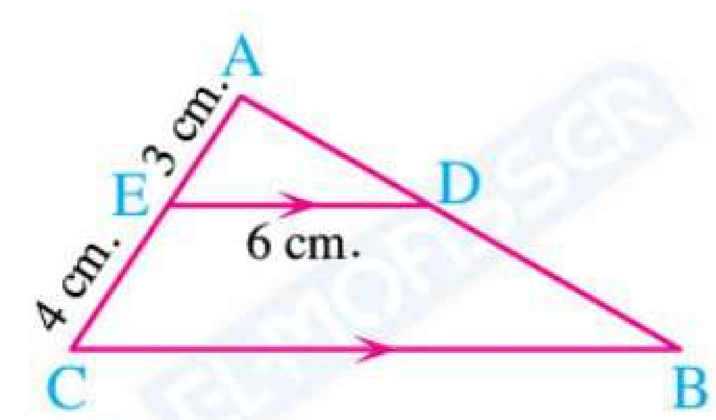
   If the area of the figure ABED = 42 cm^2, then the area of Δ CED = ... cm^2



   (a) 8 (b) 12 (c) 16 (d) 20

6. **In the opposite figure :**

   $\overline{DE} \parallel \overline{BC}$, AE = 3 cm., EC = 4 cm. DE = 6 cm., then BC = ... cm.



   (a) 14 (b) 12 (c) 21 (d) 8

7. If polygon ABCD ~ polygon XYZL and AB = 32 cm., BC = 40 cm., XY = 3 m − 1, YZ = 3 m + 1, then m = ...

   (a) 3 (b) 2 (c) 1 (d) 4

8. The simplest form of the imaginary number i^{39} is ....

   (a) 1 (b) -1 (c) i (d) $-i$

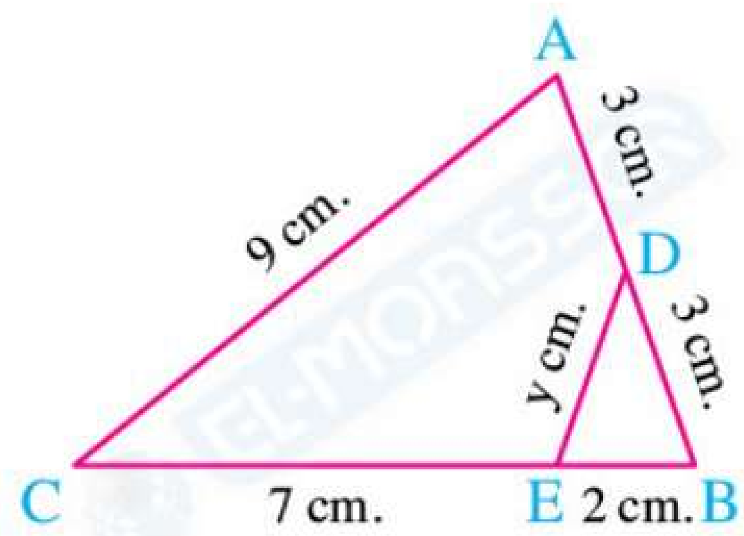
9 If $x + y\,i = (1 - 2\,i)\,(1 + i)$ where x, $y \in \mathbb{R}$, then $x + y =$ ....

(a) 2 (b) – 2 (c) 3 (d) 4

10 The angle of measure – 60° in standard position is equivalent to the angle of measure ....

(a) 60° (b) 120° (c) 300° (d) – 300°

11 **In the opposite figure :**

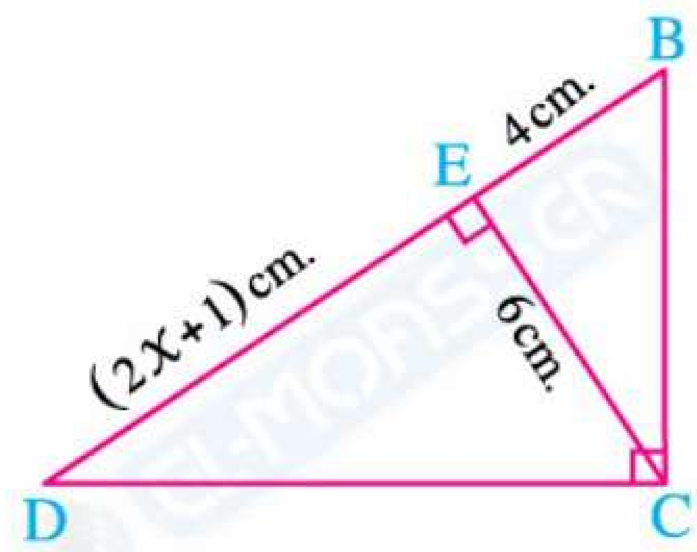


y = ... cm.

(a) 2 (b) 4.5

(c) 3.5 (d) 3

12 **In the opposite figure :**



$x =$ .... cm.

(a) 8 (b) 4

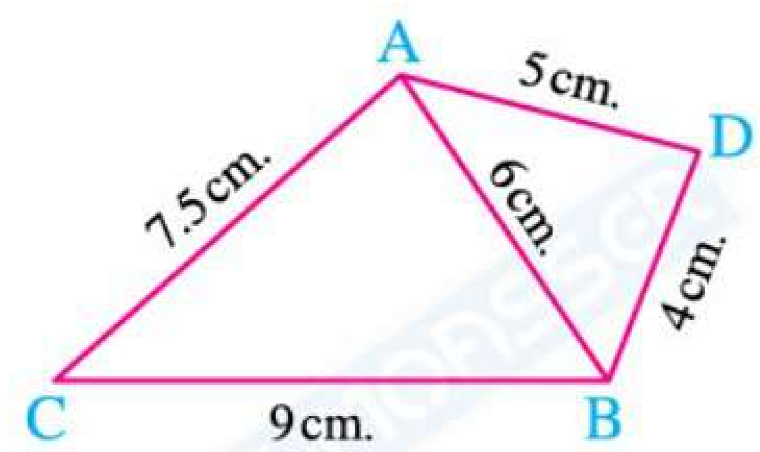
(c) 6 (d) 4.8

2 Answer the following questions :

1 Find the real values of x and y that satisfy : $\dfrac{(2 + i)\,(2 - i)}{4 + 3\,i} = x + y\,i$ (2 marks)

2 Determine the quadrant at which the angle of measure $30° + (4\,n - 1) \times 90°$ where $n \in \mathbb{Z}$ lies on (2 marks)

3 **In the opposite figure :**



ABC is a triangle in which : AB = 6 cm. , BC = 9 cm. , AC = 7.5 cm. , D is a point outside the triangle ABC where DB = 4 cm. , DA = 5 cm. **Prove that :**

(1) Δ ABC ~ Δ DBA (2) $\overrightarrow{BA}$ bisects $\angle$ DBC (2 marks)

4 $\overline{AB}$, $\overline{DC}$ two chords in a circle , $\overrightarrow{AB} \cap \overrightarrow{CD} = \{E\}$ where E outside the circle , AB = 4 cm. , DC = 7 cm. , BE = 6 cm.

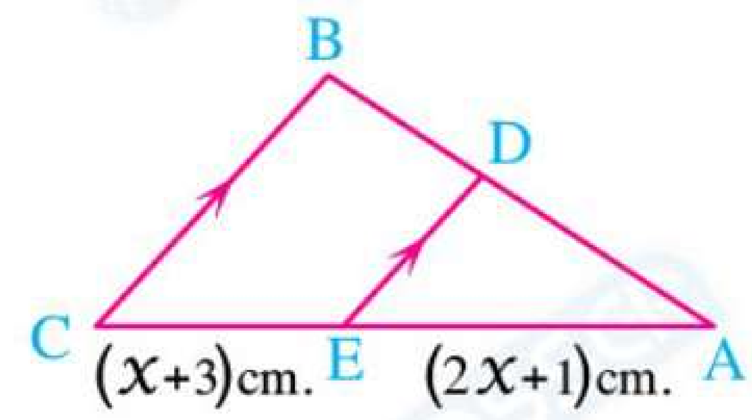
Prove that : Δ ADE ~ Δ CBE , then find length of $\overline{CE}$ (2 marks)

Test 2

Total mark
20

1 Choose the correct answer from those given : (12 marks)

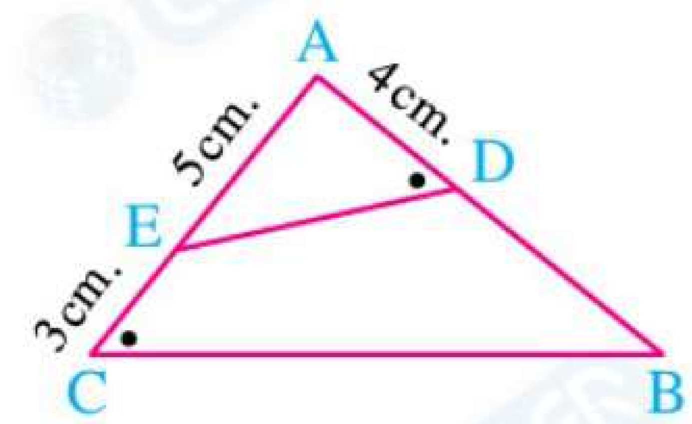
1 **In the opposite figure :**



If AD : AB = 3 : 5 , $\overline{DE} // \overline{BC}$, then x = ... cm.

ⓐ 5　ⓑ 3　ⓒ 4　ⓓ 7

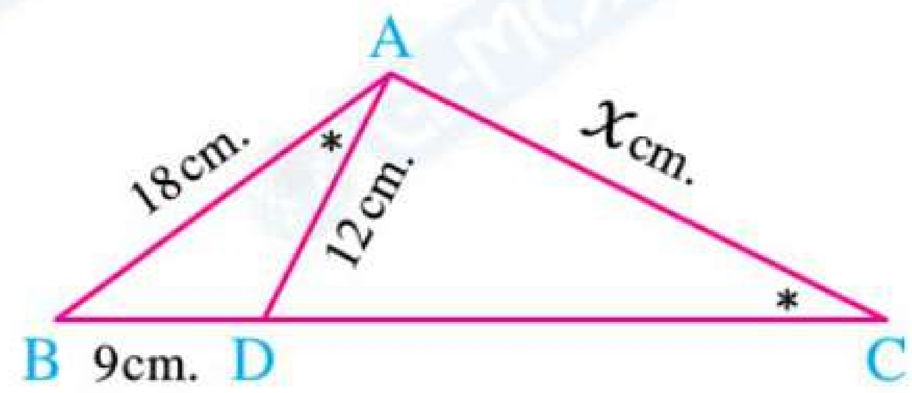
2 **In the opposite figure :**



BD = ... cm.

ⓐ 5　ⓑ 6　ⓒ 4　ⓓ 7

3 **In the opposite figure :**

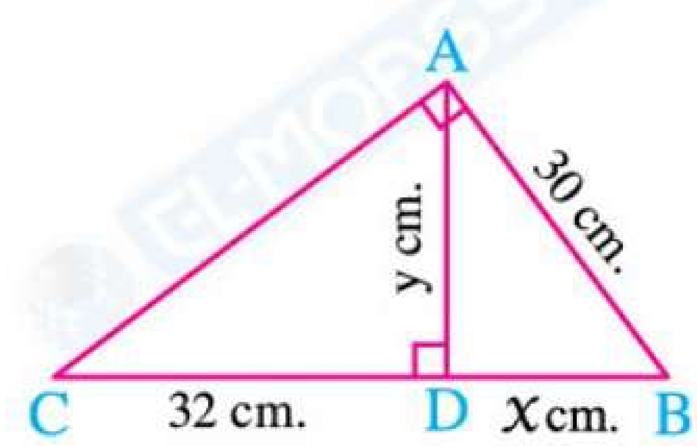


If m (∠ DAB) = m (∠ C)

, then x = ...

ⓐ 6　ⓑ 18　ⓒ 21　ⓓ 24

4 **In the opposite figure :**



ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$, AB = 30 cm.

, DC = 32 cm. , then x + y = ...

ⓐ 36　ⓑ 48　ⓒ 42　ⓓ 52

5 The angle of measure 585° in standard position is equivalent to the angle of measure ....

ⓐ 45°　ⓑ 135°　ⓒ 225°　ⓓ 315°

6 The angle of measure – 870° lies in the .... quadrant.

ⓐ first　ⓑ second　ⓒ third　ⓓ fourth

7 If $x + y\,i = (1 + i)^4$ where $x , y \in \mathbb{R}$, then $x - y$ = ...

ⓐ 16　ⓑ – 16　ⓒ 4　ⓓ – 4

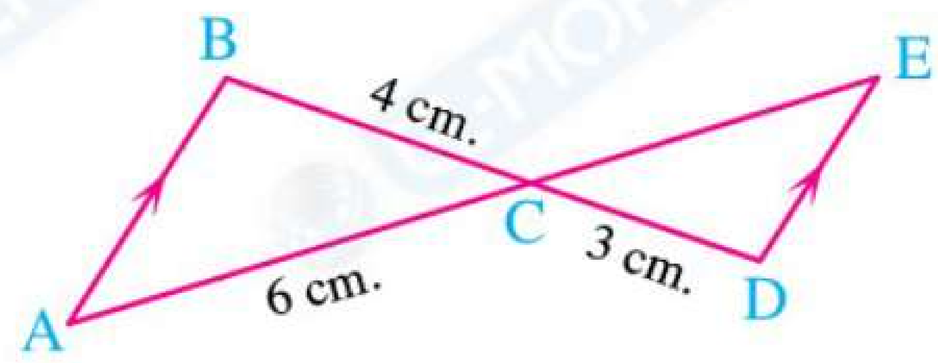
8 $2 + i + i^2 + i^3$ = ...

ⓐ 2　ⓑ 1　ⓒ – 1　ⓓ zero

9 $(12 - 5\,i^{17}) - (7 - \sqrt{-81}) = \ldots\ldots\ldots\ldots$

ⓐ $5 - 4\,i$ ⓑ $-5 + 4\,i$ ⓒ $5 + 4\,i$ ⓓ $-5 - 4\,i$

10 **In the opposite figure :**



If $\overline{AB} \parallel \overline{DE}$, CD = 3 cm. , AC = 6 cm. , BC = 4 cm.

, then CE = ... cm.

ⓐ 5.4 ⓑ 4.5 ⓒ 8 ⓓ 2.5

11 If $x + y\,i = \frac{26}{3 - 2\,i}$ where $x , y \in \mathbb{R}$, then $x \times y = \ldots\ldots\ldots\ldots$

ⓐ 10 ⓑ 12 ⓒ 26 ⓓ 24

12 Two similar polygons , the ratio between the lengths of two corresponding sides is 3 : 4 , if the perimeter of the smaller is 15 cm. , then the perimeter of the bigger is .... cm.

ⓐ 20 ⓑ $\frac{80}{3}$ ⓒ 27 ⓓ $\frac{45}{4}$

2 Answer the following questions :

1 Solve the equation : $x^2 - 4x + 5 = 0$ in the set of the complex numbers. (2 marks)

2 Write the positive measure of the smallest angle and another angle with negative measure sharing with the terminal side for the angle whose measure is (– 135°)

(2 marks)

3 ABC is a triangle , AB = 8 cm. , AC = 10 cm. , BC = 12 cm. , $E \in \overline{AB}$ where AE = 2 cm. , $D \in \overline{BC}$ where BD = 4 cm. **Prove that :**

(1) Δ BDE ~ Δ BAC and deduce the length of $\overline{DE}$

(2) The figure ACDE is a cyclic quadrilateral. (2 marks)

4 The ratio between the two perimeters of two similar triangles is 3 : 2 and the sum of their areas is 130 cm². Find the area of each of them. (2 marks)

Answers of Test 1

1 (1) ⓑ (2) ⓒ (3) ⓓ (4) ⓑ (5) ⓐ (6) ⓐ

(7) ⓐ (8) ⓓ (9) ⓐ (10) ⓒ (11) ⓓ (12) ⓑ

2 (1) $\because \frac{(2+i)(2-i)}{4+3i} = \frac{4-i^2}{4+3i} = \frac{5}{4+3i} \times \frac{4-3i}{4-3i} = \frac{5(4-3i)}{16-9i^2} = \frac{5(4-3i)}{25} = \frac{4}{5} - \frac{3}{5}i$

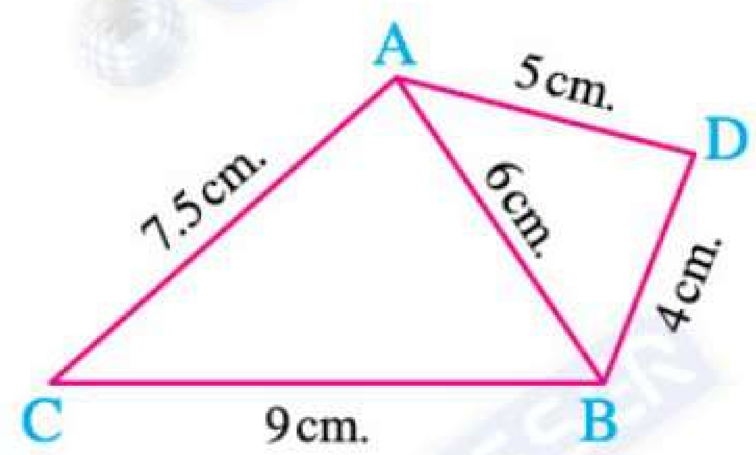
$\therefore x + yi = \frac{4}{5} - \frac{3}{5}i \qquad \therefore x = \frac{4}{5}\ ,\ y = \frac{-3}{5}$

(2) $\because 30° + (4n - 1) \times 90° = 30° + 360° n - 90° = -60° + 360° n$ (put n = 1)

$\therefore$ Smallest positive measure $= -60° + 360° \times 1 = 300°$

$\therefore$ The angle lies in the 4^{th} quadrant.

(3) $\because \frac{AB}{DB} = \frac{6}{4} = \frac{3}{2}\ ,\ \frac{BC}{BA} = \frac{9}{6} = \frac{3}{2}\ ,\ \frac{AC}{DA} = \frac{7.5}{5} = \frac{3}{2}$



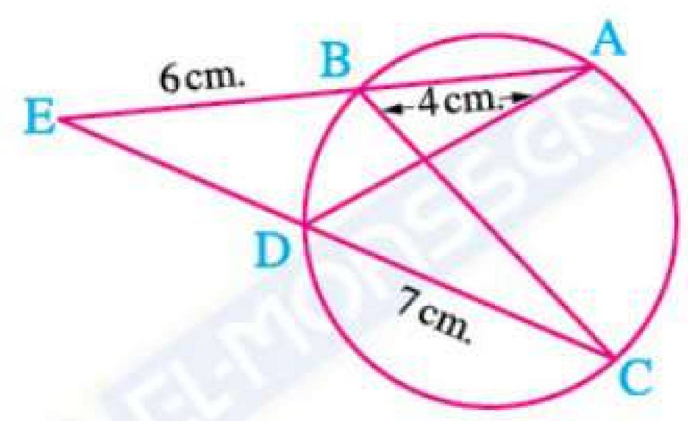
$\therefore \frac{AB}{DB} = \frac{BC}{BA} = \frac{AC}{DA}$

$\therefore \Delta ABC \sim \Delta DBA$ (Q.E.D. 1)

We deduce that : m (∠ ABD) = m (∠ ABC)

$\therefore \overrightarrow{BA}$ bisects ∠ DBC (Q.E.D. 2)

(4) $\because$ ∠ A , ∠ C are two inscribed angles subtended $\overset{\frown}{BD}$



$\therefore$ m (∠ A) = m (∠ C)

, $\because$ ∠ E is a common angle

$\therefore \Delta ADE \sim \Delta CBE$ (First req.)

$\therefore \frac{DE}{BE} = \frac{AE}{CE} \qquad \therefore \frac{DE}{6} = \frac{10}{7 + DE}$

$\therefore 7(DE) + (DE)^2 = 60$

$\therefore (DE)^2 + 7(DE) - 60 = 0$

$\therefore (DE + 12)(DE - 5) = 0 \qquad \therefore DE = 5$ cm.

$\therefore CE = 12$ cm. (Second req.)

Answers of Test 2

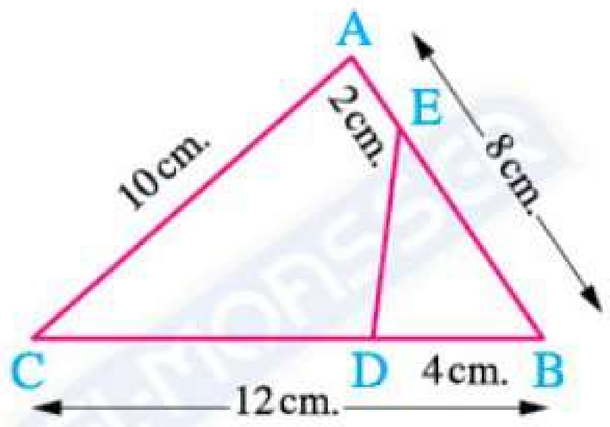
1 (1) ⓓ (2) ⓑ (3) ⓓ (4) ⓒ (5) ⓒ (6) ⓒ
(7) ⓓ (8) ⓑ (9) ⓒ (10) ⓑ (11) ⓓ (12) ⓐ

2 (1) $x = \frac{4 \pm \sqrt{16 - 4 \times 1 \times 5}}{2 \times 1} = \frac{4 \pm \sqrt{-4}}{2} = \frac{4 \pm 2i}{2} = 2 \pm i$

(2) Smallest angle of positive measure $= -135° + 360° = 225°$

, angle of negative measure $= -135° - 360° = -495°$

(3) In $\Delta\Delta$ BDE , BAC :



$\because \frac{BD}{BA} = \frac{4}{8} = \frac{1}{2}$, $\frac{BE}{BC} = \frac{6}{12} = \frac{1}{2}$ $\therefore \frac{BD}{BA} = \frac{BE}{BC}$

, $\angle$ B is common $\therefore \Delta BDE \sim \Delta BAC$

, $\frac{DE}{AC} = \frac{1}{2}$ $\therefore \frac{DE}{10} = \frac{1}{2}$ $\therefore$ DE = 5 cm. (Q.E.D. 1)

We deduce that from similarity m ($\angle$ BDE) = m ($\angle$ BAC)

$\therefore$ ACDE is a cyclic quadrilateral. (Q.E.D. 2)

(4) $\because \frac{\text{area of } 1^{st} \text{ triangle}}{\text{area of } 2^{nd} \text{ triangle}} = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

, let area of 1^{st} triangle $= 9x$

, area of 2^{nd} triangle $= 4x$

$\therefore 9x + 4x = 130$ $\therefore 13x = 130$ $\therefore x = 10$

$\therefore$ area of 1^{st} triangle $= 90$ cm^2

and area of 2^{nd} triangle $= 40$ cm^2 (The req)

Test 1

Total mark .... / 20

1 Choose the correct answer from those given : (12 marks)

(1) $\sqrt{-4} \times \sqrt{-9} =$ ....

(a) 6 (b) -6 (c) $6i$ (d) $-6i$

(2) If $x^2 - 2x + 4 = 0$, then $x =$ ....

(a) $1 \pm 3i$ (b) $1 \pm \sqrt{3}$ (c) $1 \pm \sqrt{3}\,i$ (d) $1 \pm i$

(3) If $\Delta ABC \sim \Delta XYZ$ and $AB = 3XY$, then $\frac{\text{area}(\Delta XYZ)}{\text{area}(\Delta ABC)} =$ ....

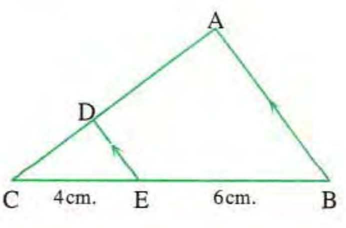
(a) 3 (b) 9 (c) $\frac{1}{3}$ (d) $\frac{1}{9}$

(4) If the terminal side of an angle of measure $(-30°)$ in standard position is rotated anticlockwise one and half revolutions, then the terminal side will be in the .... quadrant.

(a) first (b) second (c) third (d) fourth

(5) **In the opposite figure :**

If the area of the figure ABED = 42 cm^2, then the area of Δ CED = ... cm^2



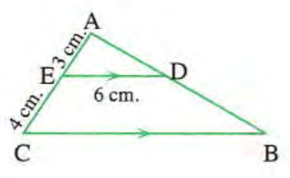
(a) 8 (b) 12

(c) 16 (d) 20

(6) **In the opposite figure :**

$\overline{DE} // \overline{BC}$, AE = 3 cm., EC = 4 cm.

DE = 6 cm., then BC = ... cm.



(a) 14 (b) 12

(c) 21 (d) 8

(7) If polygon ABCD ~ polygon XYZL and AB = 32 cm., BC = 40 cm., XY = 3 m − 1, YZ = 3 m + 1, then m = ...

(a) 3 (b) 2 (c) 1 (d) 4

(8) The simplest form of the imaginary number i^{39} is ....

(a) 1 (b) -1 (c) i (d) $-i$

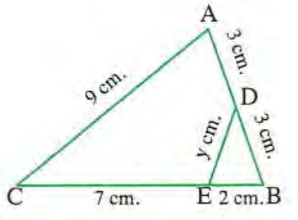
(9) If $x + y\,i = (1-2\,i)(1+i)$ where x, $y \in \mathbb{R}$, then $x + y =$ ....

(a) 2 (b) -2 (c) 3 (d) 4

(10) The angle of measure $-60°$ in standard position is equivalent to the angle of measure ....

(a) 60° (b) 120° (c) 300° (d) $-300°$

(11) **In the opposite figure :**

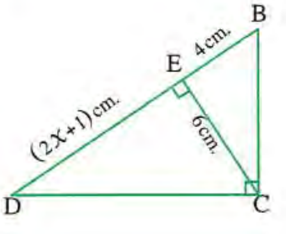


y = ... cm.

(a) 2 (b) 4.5

(c) 3.5 (d) 3

(12) **In the opposite figure :**



$x =$ .... cm.

(a) 8 (b) 4

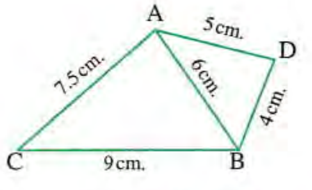
(c) 6 (d) 4.8

2 Answer the following questions :

(1) Find the real values of x and y that satisfy : $\frac{(2+i)(2-i)}{4+3\,i} = x + y\,i$ (2 marks)

(2) Determine the quadrant at which the angle of measure $30° + (4\,n-1) \times 90°$ where $n \in \mathbb{Z}$ lies on (2 marks)

(3) **In the opposite figure :**



ABC is a triangle in which : AB = 6 cm. , BC = 9 cm. , AC = 7.5 cm. , D is a point outside the triangle ABC where DB = 4 cm. , DA = 5 cm. **Prove that :**

(a) Δ ABC ~ Δ DBA **(b)** $\overrightarrow{BA}$ bisects $\angle$ DBC (2 marks)

(4) $\overline{AB}$, $\overline{DC}$ two chords in a circle , $\overrightarrow{AB} \cap \overrightarrow{CD} = \{E\}$

where E outside the circle , AB = 4 cm. , DC = 7 cm. , BE = 6 cm.

Prove that : Δ ADE ~ Δ CBE , then find length of $\overline{CE}$ (2 marks)

Test 2

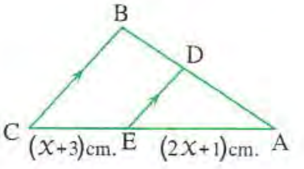
Total mark

20

1 Choose the correct answer from those given :

(12 marks)

(1) In the opposite figure :

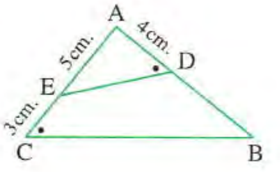


If AD : AB = 3 : 5 , $\overline{DE}$ // $\overline{BC}$, then x = ... cm.

(a) 5 (b) 3

(c) 4 (d) 7

(2) In the opposite figure :

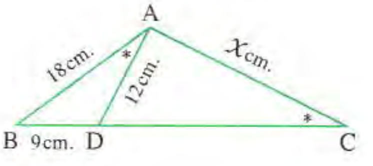


BD = ... cm.

(a) 5 (b) 6

(c) 4 (d) 7

(3) In the opposite figure :

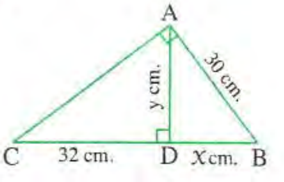


If m (∠ DAB) = m (∠ C)

, then x = ...

(a) 6 (b) 18 (c) 21 (d) 24

(4) In the opposite figure :



ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$, AB = 30 cm.

, DC = 32 cm. , then x + y = ...

(a) 36 (b) 48 (c) 42 (d) 52

(5) The angle of measure 585° in standard position is equivalent to the angle of measure ....

(a) 45° (b) 135° (c) 225° (d) 315°

(6) The angle of measure – 870° lies in the .... quadrant.

(a) first (b) second (c) third (d) fourth

(7) If $x + y\,i = (1 + i)^4$ where x , y ∈ ℝ , then $x - y$ = ...

(a) 16 (b) – 16 (c) 4 (d) – 4

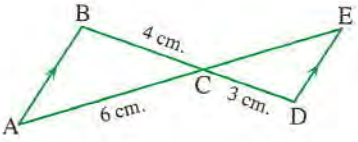
(8) $2 + i + i^2 + i^3$ = ...

(a) 2 (b) 1 (c) – 1 (d) zero

(9) $(12 - 5\,i^{17}) - \left(7 - \sqrt{-81}\right) = \cdots\cdots$

(a) $5 - 4\,i$ (b) $-5 + 4\,i$ (c) $5 + 4\,i$ (d) $-5 - 4\,i$

(10) **In the opposite figure :**



If $\overline{AB} \parallel \overline{DE}$, CD = 3 cm. , AC = 6 cm. , BC = 4 cm.

, then CE = $\cdots\cdots$ cm.

(a) 5.4 (b) 4.5 (c) 8 (d) 2.5

(11) If $x + y\,i = \frac{26}{3 - 2\,i}$ where x , $y \in \mathbb{R}$, then $x \times y = \cdots\cdots$

(a) 10 (b) 12 (c) 26 (d) 24

(12) Two similar polygons , the ratio between the lengths of two corresponding sides is 3 : 4 , if the perimeter of the smaller is 15 cm. , then the perimeter of the bigger is $\cdots\cdots$ cm.

(a) 20 (b) $\frac{80}{3}$ (c) 27 (d) $\frac{45}{4}$

2 **Answer the following questions :**

(1) Solve the equation : $x^2 - 4\,x + 5 = 0$ in the set of the complex numbers. (2 marks)

(2) Write the positive measure of the smallest angle and another angle with negative measure sharing with the terminal side for the angle whose measure is (– 135°)

(2 marks)

(3) ABC is a triangle , AB = 8 cm. , AC = 10 cm. , BC = 12 cm. , $E \in \overline{AB}$ where AE = 2 cm. , $D \in \overline{BC}$ where BD = 4 cm. **Prove that :**

(a) Δ BDE ~ Δ BAC and deduce the length of $\overline{DE}$

(b) The figure ACDE is a cyclic quadrilateral. (2 marks)

(4) The ratio between the two perimeters of two similar triangles is 3 : 2 and the sum of their areas is 130 cm.^{2} Find the area of each of them. (2 marks)

Answers of October tests

Answers of Test 1

1

(1) b (2) c (3) d (4) b (5) a (6) a

(7) a (8) d (9) a (10) c (11) d (12) b

2

(1) $\because \frac{(2+i)(2-i)}{4+3i} = \frac{4-i^2}{4+3i}$

$= \frac{5}{4+3i} \times \frac{4-3i}{4-3i} = \frac{5(4-3i)}{16-9i^2}$

$= \frac{5(4-3i)}{25} = \frac{4}{5} - \frac{3}{5}i$

$\therefore x + yi = \frac{4}{5} - \frac{3}{5}i \qquad \therefore x = \frac{4}{5} \;,\; y = \frac{-3}{5}$

(2) $\because 30° + (4n-1) \times 90°$

$= 30° + 360° n - 90°$

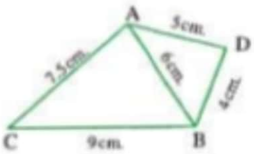
$= -60° + 360° n$ (put $n = 1$)

$\therefore$ Smallest positive measure

$= -60° + 360° \times 1 = 300°$

$\therefore$ The angle lies in the 4^{th} quadrant.

(3) $\because \frac{AB}{DB} = \frac{6}{4} = \frac{3}{2}$



$, \frac{BC}{BA} = \frac{9}{6} = \frac{3}{2}$

$, \frac{AC}{DA} = \frac{7.5}{5} = \frac{3}{2}$

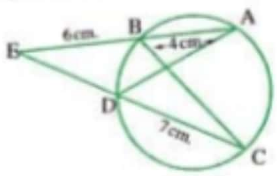
$\therefore \frac{AB}{DB} = \frac{BC}{BA} = \frac{AC}{DA}$

$\therefore \Delta ABC \sim \Delta DBA$ (Q.E.D. 1)

We deduce that : $m(\angle ABD) = m(\angle ABC)$

$\therefore \overrightarrow{BA}$ bisects $\angle DBC$ (Q.E.D. 2)

(4)



$\because \angle A , \angle C$ are two inscribed angles subtended $\overset{\frown}{BD}$

$\therefore m(\angle A) = m(\angle C)$

$, \because \angle E$ is a common angle

$\therefore \Delta ADE \sim \Delta CBE$ (First req.)

$\therefore \frac{DE}{BE} = \frac{AE}{CE} \qquad \therefore \frac{DE}{6} = \frac{10}{7 + DE}$

$\therefore 7(DE) + (DE)^2 = 60$

$\therefore (DE)^2 + 7(DE) - 60 = 0$

$\therefore (DE + 12)(DE - 5) = 0 \qquad \therefore DE = 5$ cm.

$\therefore CE = 12$ cm. (Second req.)

Answers of Test 2

1

(1) d (2) b (3) d (4) c (5) c (6) c

(7) d (8) b (9) c (10) b (11) d (12) a

2

(1) $x = \frac{4 \pm \sqrt{16 - 4 \times 1 \times 5}}{2 \times 1} = \frac{4 \pm \sqrt{-4}}{2} = \frac{4 \pm 2i}{2} = 2 \pm i$

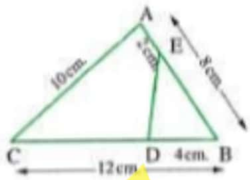
(2) Smallest angle of positive measure

$= -135° + 360° = 225°$

, angle of negative measure $= -135° - 360°$

$= -495°$

(3) In $\Delta\Delta$ BDE , BAC :



$\because \frac{BD}{BA} = \frac{4}{8} = \frac{1}{2}$

$, \frac{BE}{BC} = \frac{6}{12} = \frac{1}{2}$

$\therefore \frac{BD}{BA} = \frac{BE}{BC}$

$, \angle B$ is common $\qquad \therefore \Delta BDE \sim \Delta BAC$

$, \frac{DE}{AC} = \frac{1}{2} \qquad \therefore \frac{DE}{10} = \frac{1}{2}$

$\therefore DE = 5$ cm. (Q.E.D. 1)

We deduce that from similarity $m(\angle BDE)$

$= m(\angle BAC)$

$\therefore$ ACDE is a cyclic quadrilateral. (Q.E.D. 2)

(4) $\because \frac{\text{area of } 1^{st} \text{ triangle}}{\text{area of } 2^{nd} \text{ triangle}} = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

, let area of 1^{st} triangle $= 9x$

, area of 2^{nd} triangle $= 4x$

$\therefore 9x + 4x = 130 \qquad \therefore 13x = 130$

$\therefore x = 10$

$\therefore$ area of 1^{st} triangle $= 90$ cm^2

and area of 2^{nd} triangle $= 40$ cm^2 (The req)